

AMENDMENTS TO THE CLAIMS

Listing of the claims:

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

1. (Previously Presented) A surface acoustic wave device comprising:
a piezoelectric substrate having a first surface on which comb-like electrodes, first pads connected thereto, and a first film are provided, the first film being located so as to surround the comb-like electrodes;
a base substrate having a second surface on which second pads joined to the first pads and a second film joined to the first film are provided;
an electronic element provided on an area of the second surface facing the first surface; and
a ceramic substrate supporting the base substrate, a chip electronically coupled to the second pads being mounted on the ceramic substrate, the base substrate having a plate shape, and the first and second films joined by a surface activation process defining a cavity in which the comb-like electrodes, the first and second pads, and the electronic element are hermetically sealed.
2. (Original) The surface acoustic wave device as claimed in claim 1, wherein each of the first and second films contains a metal as a major component.
3. (Original) The surface acoustic wave device as claimed in claim 1, wherein the first and second films are joined via joining surfaces that contain gold.
4. (Original) The surface acoustic wave device as claimed in claim 1, wherein the base substrate is one of a semiconductor substrate and an insulator substrate.

5. (Original) The surface acoustic wave device as claimed in claim 1, wherein the base substrate is made of silicon.

6. (Canceled).

7. (Original) The surface acoustic wave device as claimed in claim 1, further comprising an impedance matching circuit on the second surface of the base substrate, the impedance matching circuit being coupled to at least one of the comb-like electrodes.

8. (Original) The surface acoustic wave device as claimed in claim 1, wherein the comb-like electrodes and the first pads form a transmit filter and a receive filter.

9. (Original) The surface acoustic wave device as claimed in claim 1, wherein: the comb-like electrodes and the first pads form a transmit filter and a receive filter; the surface acoustic wave device comprises an impedance matching circuit coupled to at least one of the transmit filter and the receive filter, and a common terminal via which an external connection with the impedance matching circuit can be made.

10. (Original) The surface acoustic wave device as claimed in claim 1, wherein the base substrate has via-wiring lines connected to the second pads, so that electric connections with the first pads can be made on a surface of the base substrate opposite to the second surface.

11. (Previously Presented) A surface acoustic wave device comprising:
a piezoelectric substrate having a first surface on which comb-like electrodes, first pads connected thereto, and a first film are provided, the first film being located so as to surround the comb-like electrodes; and

a base substrate having a second surface on which second pads joined to the first pads and a second film joined to the first film are provided,

the first and second films joined by a surface activation process defining a cavity in which the comb-like electrodes and the first and second pads are hermetically sealed,

wherein the surface acoustic wave device further comprises a support substrate joined to a third surface of the piezoelectric substrate opposite to the first surface;

the piezoelectric substrate and the support substrate have been subjected to the surface activation process; and

the support substrate is one of a silicon substrate and a sapphire substrate.

12. (Original) The surface acoustic wave device as claimed in claim 1, wherein the first film is provided on peripheral portions on the first surface of the piezoelectric substrate, and the second film is provided on peripheral portions on the second surface of the base substrate.

13. (Previously Presented) A method of fabricating a surface acoustic wave device comprising the steps of:

(a) forming a first film on a first surface of a piezoelectric substrate on which comb-like electrodes and first pads are formed so as to be surrounded by the first film;

(b) forming a second film on a second surface of a base substrate on which second pads and an electronic element are formed so as to be surrounded by the second film, the second film and the second pads corresponding to the first film and the first pads in position, the base substrate having a plate shape and being supported by a ceramic substrate on which a chip electronically coupled to the electronic element is mounted;

(c) subjecting a surface activation process to surfaces of the first and second films; and

(d) joining the first and second films so as to join activated surfaces thereof, the comb-like electrodes, the first and second pads and the electronic element being hermetically sealed in a cavity defined by the first and second films.

14. (Original) The method as claimed in claim 13, wherein the steps (a) and/or (b) forms the first and/or second film that contains a metal as a major component.

15. (Original) The method as claimed in claim 13, further comprising a step of forming an electric element on the second surface.

16. (Original) The method as claimed in claim 13, further comprising a step of forming via-wiring lines in the base substrate so that the second pads can be extended to a third surface of the base substrate opposite to the second surface.

17. (Previously Presented) A method of fabricating a surface acoustic wave device comprising the steps of:

(a) forming a first film on a first surface of a piezoelectric substrate on which comb-like electrodes and first pads are formed so as to be surrounded by the first film;

(b) forming a second film on a second surface of a base substrate, the second film corresponding to the first film in position;

(c) subjecting a surface activation process to surfaces of the first and second films; and

(d) joining the first and second films so as to join activated surfaces thereof, the comb-like electrodes being hermetically sealed in a cavity defined by the first and second films,

wherein the method further comprises a step of joining a support substrate to a backside of the piezoelectric substrate opposite to the first surface after an interface between the piezoelectric substrate and the support substrate is subjected to the surface activation process,

the support substrate being one of a silicon substrate and a sapphire substrate.

18. (Currently Amended) A surface acoustic wave device comprising:

a piezoelectric substrate having a first surface on which comb-like electrodes, first pads connected thereto, and a first film are provided, the first film surrounding the comb-like electrodes;

a base substrate having a second surface on which second pads joined to the first pads and a second film joined to the first film are provided; and

an electronic element provided on an area of the second surface facing the first surface, wherein the first film and the second film are configured to be joined by a surface activation process and to define a cavity in which the comb-like electrodes, the first pads, the second pads, and the electronic element are hermetically sealed,

the second pads being electrically extended via a through hole penetrating the base substrate, to a third surface of the base substrate opposite to the second surface thereof,

the first and second films being electrically extended, via another through hole penetrating the base substrate, to the third surface,

the piezoelectric substrate and the base substrate having an identical width and length forming flat side surfaces of the surface acoustic wave device.

19. (Currently Amended) A method of fabricating a surface acoustic wave device, comprising the steps of:

(a) forming a first film on a first surface of a piezoelectric substrate comprising comb-like electrodes and first pads, wherein the first film surrounds the comb-like electrodes and the first pads;

(b) forming a second film on a second surface of a base substrate comprising second pads and an electronic element, wherein the second film surrounds the second pads and the electronic element, and a position of the second film and the second pads corresponds to a position of the first film and the first pads, respectively;

(c) applying a surface activation process to surfaces of the first film and surfaces of the second film; and

(d) joining the first film and the second film so as to join the activated surfaces thereof, wherein the comb-like electrodes, the first pads, the second pads, and the electronic element are hermetically sealed in a cavity defined by the first film and the second film,

the second pads being electrically extended, via a through hole penetrating the base substrate, to a third surface of the base substrate opposite to the second surface thereof,

the first and second films being electrically extended, via another through hole penetrating the base substrate, to the third surface,

the piezoelectric substrate and the base substrate having an identical width and length forming flat side surfaces of the surface acoustic wave device.

20. (Currently Amended) A surface acoustic wave device comprising:

a piezoelectric substrate having a first surface on which comb-like electrodes, first pads connected thereto, and a first film are provided, the first film being provided along edges of the piezoelectric substrate and being located so as to surround the comb like electrodes; and

a base substrate having a second surface on which second pads joined to the first pads and a second film joined to the first film are provided, the second film being provided along edges of the base substrate,

wherein the first and second films are configured to be joined by a surface activation process and define a cavity in which the comb-like electrodes and the first and second pads are hermetically sealed,

edges of the first and second films being flush with side surfaces of the piezoelectric substrate and those of the base substrate and forming parts of side surfaces of the surface acoustic wave device,

the base substrate having a contact hole for making an external connection with the first and second films.

21. (Currently Amended) A method of fabricating a surface acoustic wave device comprising the steps of:

(a) forming a first film on a first surface of a piezoelectric substrate on which comb-like electrodes and first pads are provided, wherein the first film surrounds the comb-like electrodes and the first pads and is provided along edges of the piezoelectric substrate;

(b) forming a second film on a second surface of a base substrate comprising second pads, wherein the second film is provided along edges of the base substrate, and a position of the second film and the second pads corresponds to a position of the first film and the first pads respectively;

(c) applying a surface activation process to surfaces of the first film and surfaces of the second film; and

(d) joining the first film and the second film so as to join the activated surfaces thereof, wherein the comb-like electrodes, the first pads and the second pads are hermetically sealed in a cavity defined by the first film and the second film,

edges of the first and second films being flush with side surfaces of the piezoelectric substrate and those of the base substrate and forming parts of side surfaces of the surface acoustic wave device,

the base substrate having a contact hole for making an external connection with the first and second films.